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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,443	02/19/2002	Atsuhiro Ohkawa	030662-082	9882

7590 11/06/2003

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EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1772	6

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/076,443	OHKAWA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this c mmunication appears on the cover sheet with the c rresp ndence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 17, 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. It is unclear if the limitation "maximum transmittance of all rays of more than 75% and the minimum transmittance for all rays of less than 60%" actually means maximum transmittance of all rays along the transmittance axis of more than 75% and the minimum transmittance of all rays along the non-transmittance axis of less than 60%.

b. It is unclear if the limitation "transparent axis" means transmittance axis.

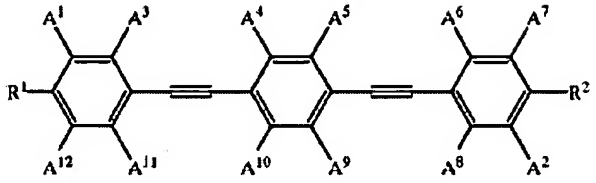
Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2, 4-10, 13, 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al. (US 6,149,837).

(I)



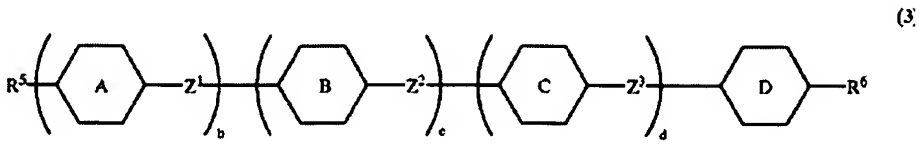
In the formula, A^1 to A^{12} each independently represent a hydrogen atom, a fluorine atom, or an alkyl group having 1 to 10 carbon atoms, and at least one is an alkyl group (provided that, in A^1 to A^{12}, the cases are excluded where both of A^1 and A^2 are methyl groups at the same time, while the others are hydrogen atoms, and where both of A^7 and A^{12} are methyl groups at the same time, while the others are hydrogen atoms); R^1 and R^2 each independently represent a hydrogen atom, a fluorine atom, a cyano group, a 4-R^3-(cycloalykyl) group, a 4-R^3-(cycloalkenyl) group, or a R^4—$(O)_q$ group (where R^3 represents a hydrogen atom, a linear or branched alkyl group having 1 to 12 carbon atoms which may be substituted by fluorine, a linear or branched alkenyl group having 2 to 12 carbon atoms which may be substituted by fluorine, or a linear or branched alkynyl group having 2 to 12 carbon atoms which may be substituted by a fluorine

Sekine et al. has an optical film comprising a polymer dispersed liquid crystal element layer (column 1, lines 1-20), and is directed to a liquid crystal display (column 3, lines 1-5).

The compound with high refractive index anisotropy above is the same as Applicant's formula (I). In Sekine et al., R^1 and R^2 each independently represent a hydrogen atom (rendering the end aromatic ring a monovalent one), a cyano group (column 3, lines 10-35) which yields an embodiment wherein: $Ar^1 = Ar^2$ = monovalent aromatic group, and Ar^3 = divalent aromatic hydrocarbon group in claim 1.

Since Sekine et al. teaches that the hydrogen atom on the aromatic ring is substituted by a halogen atom in order to improve compatibility with the other materials (liquid crystals) in the polarizing layer (column 2, lines 35-65), in the absence of a showing of unexpected results, it is

the examiner's position that substitution of the hydrogen on the aromatic ring with a hydroxyl group is the result of routine experimentation.



Sekine et al. also teaches the compound above (formula 3) wherein b = 1, c = 1, d = 0 (no C ring or Z^3 linking group), and A, B and D each independently represent 1, 4- phenylene (six-membered aromatic hydrocarbon group), 2,5-pyrimidinediyl, 5,2-pyrimidinediyl, 2,5-dioxanediyl or 5,2-dioxanediyl (six-membered aromatic heterocylic group), and R^5 and R^6 independently represent a hydrogen atom (rendering aromatic ring A or D a monovalent one), a cyano group (rendering aromatic ring A or D a monovalent cyano-substituted one), or a linear or branched alkenyl group (the unsaturated pendant double bond is polymerizable) (column 4, lines 35-65). Z^1 and Z^2 each independently represent an alkynylene group having 2 carbons (triple bond acetylene) (column 5, lines 1-10).

Sekine et al. teaches that the phenylacetylene compound above has a large anisotropy of refractive index (column 2, lines 65-70) so that the layer is highly polarizing due to its large refractive index anisotropy and thus selectively transmits polarized light along one optical axis and selectively reflects or scatters other polarized light along another optical axis.

Since Sekine et al. directs the invention to an optical polymer dispersed liquid crystal (PDLC) element using the phenylacetylene (liquid crystal) compound (column 1, lines 1-20), and transparent supports for PDLC optical elements are notoriously well known in the art, it would have been obvious to one of ordinary skill in the art to have used an optically transparent support

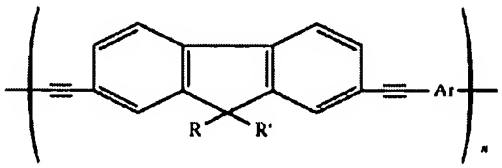
for the polarizing liquid crystal phenylacetylene layer. The polymer matrix phase is isotropic in terms of refractive index in PDLC optical elements.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al. as applied to claims 1-2, 4-10, 13, 15-16 above, and further in view of Kim et al. (US 5,876,864).

Sekine et al. has been discussed above and teaches the phenylacetylene liquid crystal of formula (I) in a PDLC film. The phenylacetylene of formula (I) has a large anisotropy of refractive index (column 2, lines 65-70) so that the layer is highly polarizing due to its large refractive index anisotropy and thus selectively transmits polarized light along one optical axis and selectively reflects or scatters other polarized light along another optical axis.

Sekine et al. fails to teach that the divalent aromatic ring B which corresponds to Applicant's Ar^3 is a divalent aromatic group formed by connecting two or three groups thereof.

Kim et al. has an optical film comprising a polymer with the formula below (abstract, column 4, lines 1-70):



It can be seen from the reaction scheme (column 7, lines 1-45) that Applicant's aromatic acetylene compound is formed when intermediate compound (A) is coupled with two Br-Ar instead of two Br-Ar-Br. The monosubstituted bromoaromatic compound is a homolog of the disubstituted bromoaromatic compound. Since it is blended in the amount of 0.1 to 50 weight % with isotropic polymers (such as polymethylmethacrylate, polyacrylate, polycarbonate,

polyethylene terephthalate) (column 9, lines 1-30), on the low end of the weight % range, the blend is a polymer dispersed liquid crystal wherein the isotropic polymer comprises the matrix. The optical film comprises a transparent support (column 8, lines 45-60) in a display device (column 1, lines 15-25).

Since both Kim et al. and Sekine et al. teach the use of polymer dispersed liquid crystal films in display devices, they are analogous art.

Therefore Kim et al. demonstrates that it would have been obvious to one of ordinary skill in the art to have used the divalent connected aromatic rings of Kim et al. in place of the divalent aromatic ring in the invention of Sekine et al. in order to obtain an alternate polymer dispersed liquid crystal film.

6. Claims 11-12, 14, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson (US 5,751,388) in view of Sekine et al.

Larson has a liquid crystal display (LCD) which comprises a liquid crystal cell (10) and comprises a pair of polarizing plates (15, 16) sandwiching the liquid crystal cell (10), wherein the optical light scattering (pre) polarizing film (17) is provided between a backlight (13) and the polarizing plate on the backlight side of the cell (16) (column 4, lines 25-55) as seen in the embodiment on the next page. The liquid crystal cell comprises a liquid crystal compound sealed between a pair of substrates having a transparent electrode and a pixel electrode as is notoriously well known in the art.

Larson teaches an embodiment of the light scattering polarizing film (PSSE layer) wherein anisotropic (birefringent liquid) crystals are aligned along an axis and embedded within an isotropic (non-birefringent) polymer matrix, whereby the film can be a uniaxially stretched

aligned polymer dispersed liquid crystal (PDLC) layer (structure) (column 8, lines 40-50 and column 7, lines 40-70). In the absence of a showing of unexpected results, it is the examiner's position that the claimed mean particle (crystal) size of 0.01 to 1.0 μm, and the claimed amount of stretch of the film by ten times or less are results of routine experimentation.

Larson teaches that the PSSE layer transmits approximately 90 % via the pass axis and 30 % via the rejection axis, which respectively overlap the claimed range of maximum transmittance of all rays of more than 75% and the claimed range of minimum transmittance for all rays of less than 60% (column 7, lines 1-20). The difference between the refractive index of the optically isotropic phase (polymer matrix) and the refractive index of the optically anisotropic phase (LC) is less than 0.05 (matches) along a direction (ordinary or extraordinary) in a surface plane of the polymer dispersed liquid crystal film (PDLC structure) (column 6, lines 20-40).

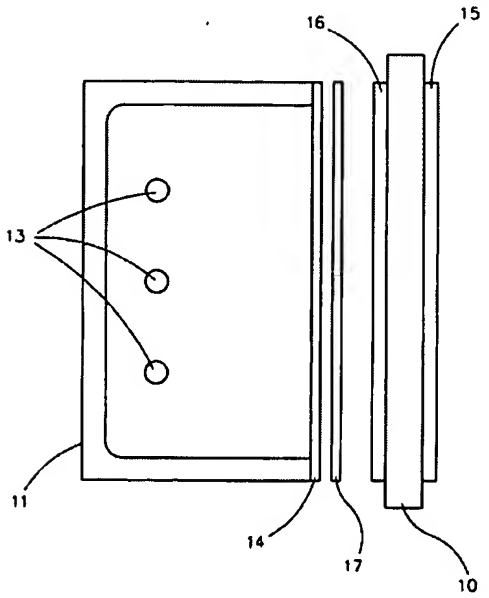
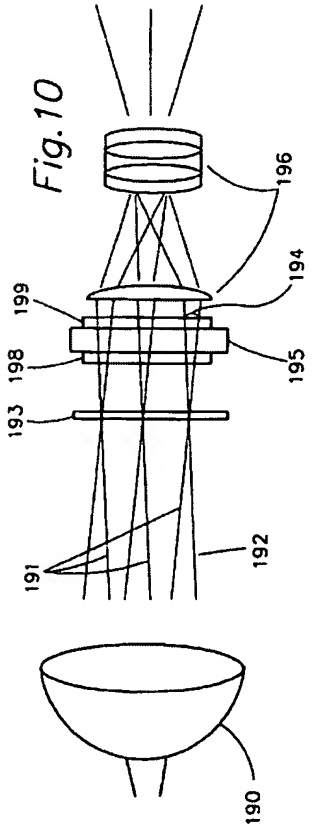


Fig. 1

The rear polarizer 198 in Fig 10 below is described as being absorbing (column 13, lines 50-70) and the polarizing element of light scattering kind (PSSE layer 193) has the axis having the polarizing plane giving the maximum transmittance for all rays parallel to the transparent axis of the polarizing element of light absorbing kind (output polarization rays of 193 match the pass-axis of the rear polarizer 198) (column 14, lines 1-10). It can be seen from the figure that the polarizing plane of the light scattering polarizing element 193 has a polarization plane perpendicular to the surface plane of said element 193 since the transmitted rays are perpendicular to the surface plane of the element.



Larson fails to teach that the liquid crystal in the PDLC film comprises the claimed formula (I) of Applicant, or to specify that the active matrix LCD (AMLCD) (column 4, lines 25-45) has a transparent electrode and a pixel electrode.

Sekine et al. has been discussed above and teaches the liquid crystal of formula (I) in a PDLC film. The liquid crystal of formula (I) has a large anisotropy of refractive index (column 2, lines 65-70) so that the layer is highly polarizing due to its large refractive index anisotropy and thus selectively transmits polarized light along one optical axis and selectively reflects or scatters other polarized light along another optical axis. Sekine et al. teaches that the compound is more advantageous in stability to light (column 3, lines 1-5).

In addition, Sekine et al. teaches that in the active matrix LCD, a thin film transistor (which forms part of the active element electrode of the LCD) is provided on each pixel (column 1, lines 40-50) thus forming a pixel electrode. The transparent common electrode comprising the opposite end of the liquid crystal cell is notoriously well known in the art.

Since Sekine et al. teaches that the phenylacetylene liquid crystal of formula (I) has a desirably large refractive index anisotropy and is more advantageous in stability to light, it would have been obvious to one of ordinary skill in the art to have used the phenylacetylene liquid crystal of Sekine et al. and its analogs as the liquid crystal component of the polarizing light scattering film in the invention of Larson in order to obtain a liquid crystal display with the desired light-scattering properties which are stable to light.

Since Sekine et al. and Larson teach the use of a polarizing light-scattering PDLC film in a liquid crystal display, they are analogous art.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (703)308-3265. The examiner can normally be reached Monday to Friday from 9:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (703)308-4251. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

SH
Sow-Fun Hon
10/29/03

HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772
11/3/03